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INDUSTRY

TWO NEW VARIETIES OF ALMOND: THE JORDANOLO AND THE HARPAREIL

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INTRODUCTION

A comprehensive study of almond varieties published in 1925 [1] emphasized the faults and weaknesses of the varieties now in the trade. After discussing the varietal qualities and characteristics desirable from the standpoint of grower, dealer, and consumer, the author states:

> When the necessity of taking all of these requirements into account is realized, it is not difficult to see why most of the varieties grown in California, whether native in origin or imported, have proved unsatisfactory.

Breeding work with the almond by the United States Department of Agriculture in cooperation with the California Agricultural Experiment Station has been in progress for a considerable number of years, with the objective of developing varieties possessing a higher degree of merit than those now available and superior from the standpoint of grower, dealer, and consumer.

During the period covered by these breeding investigations some 14,000 hybrid trees, the results of hand-made crosses, have been grown or are still under test, and their product has been or is being evaluated.

ORIGIN

The Jordanolo and Harpareil almond varieties were selected from a large number of trees that originated from crosses made between the Harriott and Nonpareil varieties. The pollen parent, Harriott, was chosen largely because of its vigorous growth, dense and thrifty foliage, ability to bear in old age, and its tendency to produce well when grown in sandy soils. It was chosen also with a view to ob-

[1] WOOD, MILO N. ALMOND VARIETIES IN THE UNITED STATES. U. S. Dept. Agr. Bull. 1282, 142 pp., illus. 1924. See p. 4.

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taining large size of nut, plumpness of kernel, and firm texture of shell. The pistillate parent, Nonpareil, was selected because of its rather regular bearing habit and its production of thin-shelled nuts having a high kernel content and smooth, light-colored kernels.

The new Jordanolo variety was grown in trial plots in various places in California under the number 8–32, and the Harpareil under the number 8–31. The first part of the name Jordanolo was adopted because of the resemblance of the kernels of hybrid No. 8–32 to those of the Jordan variety; the last part of the name was taken from the last three letters of the word "Yolo," the county in which the horticultural division of the cooperating California Agricultural Experiment Station is located. The name Harpareil for hybrid No. 8–31 was taken from the first part of the name of the male parent variety "Harriott" and the last part of the name of the female parent "Nonpareil."

Out of the number of hybrids thus far tested it was felt that these two selections possess sufficient merit, in comparison with varieties already available, to justify naming them and introducing them to the trade.

THE JORDANOLO

DESCRIPTION

TREE

Vigorous grower (appears to be greatly influenced by type of rootstock); upright (ratio of width to height of head 1:1¼), but branches tend to droop at ends, especially when in bearing (fig. 1).

Trunk.—Very stocky; generally with long depressions and long ribs or bulges, i. e., cross section irregular; fibers generally twist in trunk and large branches; bark rather thick, rough, with deep cracks becoming wide on old wood, and exfoliating in large thick patches.

Main branches.—Under most conditions, branches grow long, but produce many short side branches ranging from short spurs to shoots several inches in length; branches tend to curve downward, ends of outer branches especially drooping. Branching angle of top branches often sharply acute, lower branches widely to very widely acute, sometimes closely approaching a right angle. Wood very tough. Bark after first year generally reddish gray (the red color may be overlain with gray). Young bark exfoliates in thin patches and may appear very smooth; old bark rough, exfoliating in large, thick patches.

Shoots.—Shoots generally grow vigorously; after first year many short side shoots and spurs develop, giving branches a dense appearance. Wood rather tough for almond but in first-year shoots it is less tough than in older branches. Bark on young shoots bright green or grayish green, turning darker later in the growing season; sometimes reddish patches appear.

Lenticels.—Generally numerous and small on young bark. After first few years and on old bark, lenticels very numerous; much raised; long, narrow, with apexes ranging from blunt to bluntly acute.

Foliage.—Very dense. Leaves vary greatly in size, especially on spurs; average large on young shoots. In a lengthwise direction, leaves may be straight, recurved, or curved upward slightly, all types being generally found on same tree (fig. 2).

Blade.—Average large, but range from very large to very small. Many curve upward in cross section. Generally wide; many young immature blades very wide (ratio of width to length varies greatly; in mature blades average about 1:3, seldom 1:2½, very occasionally 1:4; in immature blades often 1:2). Shape of mature leaves elliptical-ovate; margin generally convex throughout entire length of blade (occasionally there is a straight or concave portion near apex, as is common with many other varieties). Many immature leaves broadly elliptical, a few obovate. Base generally obtuse; sometimes acute, especially on immature leaves. Margins often slightly unsymmetrical, especially on mature leaves. Apex bluntly acute on mature leaves to very obtuse on young

leaves. On very young leaves, apex sometimes very obtuse. Margins widely and deeply crenate. Bristles generally absent; when very occasionally found, they are short and dark. Upper surface of blade a rather bright deep green, smooth and somewhat glossy; under surface a dull green, somewhat lighter

FIGURE 1.—The original Jordanolo tree. Note the vigorous growth of this tree and the dense, dark-colored foliage. Although the nuts do not show well in this illustration, the branches are bending over with the weight of the crop. A regular heavy-bearing tendency is characteristic of this tree.

than upper, but this difference in color is less marked than in some other varieties. Midrib prominent, lighter in color than surface of blade.

Petiole.—Rather long and stocky, especially long on young leaves (average length about 1 inch). Average ratio of length of petiole to length of blade

about 1 : 2½ on mature leaves, occasionally 1 : 3, on immature leaves ratio very variable, often 1 : 2. Petiole deeply grooved on upper surface throughout entire length. Glands one to five (three commonly, four or five occasionally, one or two often found at base of blade, and two or three on petiole near blade). Petiole near base of blade often slightly expanded.

IMMATURE NUT

Size.—Large.

Shape.—Roughly elliptical; ventral edge much more curved than dorsal, rather deeply creased, sometimes ridged. Base blunt but generally narrow; apex

FIGURE 2.—Shoot of Jordanolo, showing shape of leaves. Leaves differ in shape according to age and size. Some of the leaf blades of the larger leaves are unsymmetrical, as is clearly shown at the base of the blade in the center of the illustration.

blunt. Style generally drops early, often leaving a small projection on apex end of hull.

Hull.—Outer surface light green, frequently turns darker or reddish brown later in season. Pubescence abundant, short, fine, gray to light brown when dry. Dehisces on ventral edge.

HULLED NUT

Size.—Somewhat variable, averages large (pl. 1, *A*).

Shape.—Moderately plump: long oval or oval ovate (viewed edgewise, long oval). Axis one-fourth to one-third way from dorsal to ventral edge. Ventral edge very thick; much curved. Wing thin, very wide, usually prominent entire

A

B

A, Jordanolo nut and kernel. The nut is large and attractive in appearance. The large kernel is attractive and has a smooth surface. Note the close resemblance of the kernel to that of the Jordan in shape. *B*, Harpareil nut and kernel. In shape and size this nut is in the Ne Plus Ultra class. The kernel, however, is large, smooth, and attractive and is superior to the kernel of the Ne Plus Ultra. The chief defect of the Harpareil is the production of double kernels, which are somewhat less in number than in the Ne Plus Ultra.

length of nut; flange less prominent on right side of wing than on left (when base is held uppermost), giving wing a greater width on right side than on left. Dorsal edge slightly curved (variable in curvature but always much less curved than ventral edge), with slight and narrow ridge or fiber on surface of dorsal edge. Base generally slightly tapering; dorsal shoulder slightly sloping; ventral shoulder generally sharply rounding, always more so than dorsal; stem scar rather small, slightly sloping ventrally. Apex blunt, generally with wing very prominent.

Shell.—Very soft and thin. Outer shell very thin, generally firm on surface but often spongy underneath. Outer surface very light in color. Pits medium to rather numerous in number; mostly large in size; round or oval in shape;

FIGURE 3.—Rows of Jordanolo and Harpareil trees planted in orchard form (Jordanolo on right, Harpareil on left). These trees were photographed when 3½ years old. Note the great vigor of both of these varieties.

deep. Shell finely grooved or smooth at base. Canals rather large, generally elliptical in cross section. Fibers large. Inner shell very thin, hard with slightly undulating light-brown inner surface. Ventral streak very wide as a rule, extending from apex to about three-fourths distance to base, dark brown in color. Base end generally blunt.

Kernel.—Practically all singles; doubles rare. Size averages large. Shape rather plump, irregular oval or ovate (viewed edgewise shape is long ovate or long oval). Ventral edge much more curved than dorsal. Dorsal shoulder rounded and projecting prominently above scar; dorsal edge of shoulder always more sharply rounding than ventral, giving ventral shoulder a sloping appearance. Apex rather blunt, ending in small sharp point. Pellicle light in color, rather thick and tough; smooth except for slight pubescence at immediate apex; pellicle fold small to medium; base scar medium brown, rather large, wide oval in shape.

CHARACTERISTICS

The Jordanolo trees are vigorous and thrifty growers (fig. 3), but this characteristic may be greatly modified by the rootstock upon which the variety is grown. Because of the dense healthy foliage, the variety seems capable of producing great quantities of fruit buds every year, and there seems to be less tendency to alternate bearing in this variety than in many of the present commercial varieties. The original tree at Davis, Calif., and others of the variety grown on trial plots in various localities in the State have averaged very heavy annual crops. From the standpoint of yield the variety is promising (fig. 4). The tree is resistant to attacks by mites (red spiders). This is a valuable characteristic, because mites are one of the worst

FIGURE 4.—Branches of the Jordanolo showing bearing habit. As a rule the nuts are well distributed. When the crop is exceedingly heavy the nuts are borne in clusters. The bearing habit of the Harpareil is similar, except that the Jordanolo bears more regularly than the Harpareil.

pests in almond orchards. Nuts of the Jordanolo variety are among the easiest to knock from the trees. Growers report that the nuts separate from the hulls easily and can be run through the hullers rapidly. It is evident that the Jordanolo nuts can be harvested and hulled much more easily and cheaply than the Nonpareil, Ne Plus Ultra, and nuts of similar types.

The Jordanolo is a large, long, soft-shelled nut resembling the Ne Plus Ultra in shape (pl. 1, *A*). The shell has an attractive light-yellow color and requires little or no bleaching; although it is soft, it is firm enough for the nuts to be hulled and handled satisfactorily. The nut in the shell can be marketed with the Ne Plus Ultra, but it has a much superior kernel. The kernel is large, plump, and attractive in appearance. It has a nearly smooth surface, free from the objectionable roughness characteristic of the Ne Plus Ultra kernel.

The percentage of kernel to the whole nut averages more than 55 percent and in some cases is as high as 65. The kernels are of very high quality and are very similar to those of the Jordan in size, shape, and quality. Commercial firms report the variety to be outstanding from a blanching standpoint, although the pellicle of the kernel is somewhat tough, causing some breakage to occur and in some instances necessitating some hand work. The blanched kernels are large, light in color, and very attractive in appearance, with a superior natural gloss found in only a very few varieties. The blanched and salted kernels are very crisp and tender, surpassing in tenderness those of any other commercial varieties. It is thought that the Jordanolo kernels will command a high price because of their large size, good quality, and excellent appearance.

The variety blooms early, usually with the Ne Plus Ultra variety, or in some cases slightly earlier; therefore, it is about as subject to injury from spring frosts as is the Ne Plus Ultra.

The Jordanolo interpollinates very successfully with the Ne Plus Ultra and with the I. X. L. It often blooms late enough to interpollinate with the Peerless and Nonpareil, but sometimes it blooms too early for these varieties. The Jordanolo is intersterile with the Harpareil.

ADAPTATION

The Jordanolo has been tested under various conditions on 125 trial plots in different parts of California. Although most of the trees have borne only a few crops, it is believed that they have been under experiment long enough to warrant statements about their performance. In all localities and under most conditions the trees grow thriftily and produce vigorous and healthy foliage. On the average, the trees have been very heavy bearers.

The Jordanolo seems to be adapted to every distrtct where the almond is grown. Its main defect is its early blooming habit. It is, therefore, as previously stated, about as liable to injury from spring frost as is the Ne Plus Ultra, and orchard heating is about as necessary fo rit as for that variety.

THE HARPAREIL

DESCRIPTION

TREE

Vigorous grower. Rather upright (ratio of width to height of head 1:1). Tends to branch profusely (fig. 5).

Trunk.—Rather stocky and inclined to be straight grained; bark medium in thickness and rough, with rather deep cracks, exfoliates in rather large patches.

Main branches.—Tend to grow straight, outer branches droop. Branching angle widely acute. Wood moderately tough. Bark gray or brownish gray. Young bark exfoliates in thin flakes.

Shoots.—Shoots grow rather vigorously; spurs or lateral shoots rather numerous.

Lenticels.—Somewhat numerous; raised; medium in size; rather short and wide with bluntly acute or rounded ends; on old bark, gray streaks often run out from end of lenticels.

Foliage.—Dense. Leaves very wide in proportion to length and variable in shape and size, especially so on spurs.

Blade: Rather large; varies greatly in size (fig. 6). Wide in proportion to length but varies (average ratio of width to length in mature leaves 1:2¼, often 1:2; on young immature leaves 1:2 common). Shape of mature leaves

generally ovate; young leaves often widely elliptical. Base obtuse. Origin of margins at base practically symmetrical or very nearly so. Apex generally cuneiform, but also commonly widely acute. Margins crenate or double crenate. Bristles practically always absent. Color of upper surface of blade bright green, surface glossy; under surface dull green, somewhat lighter than upper. Midrib quite prominent, lighter in color than blade.

Petiole.—Medium to short in length and quite stocky (average length about 1 inch, ratio of length of petiole to length of blade in mature leaves 1:4; occasionally 1:3). Groove entire length of petiole, rather deep and wide. Petiole

FIGURE 5.—Harpareil tree showing typical habit of growth. Foliage is dense. Tree is more spreading than the Jordanolo.

tends to widen slightly near base of leaf. Glands two to six, often two or three on base of blade and two or three on petiole; vary greatly in number.

IMMATURE NUT

Size.—Large.

Shape.—Generally elliptical; ventral edge more curved than dorsal; base bluntly acute to quite pointed; apex bluntly acute to pointed, generally with a small sharp point; rudiment small.

Hull.—Outer surface grayish green. Pubescence fine, gray. Shallow crease on ventral edge common. Dehisces on ventral edge.

HULLED NUT

Size.—Variable, average large (pl. 1, *b*).

Shape.—Plump; moderately wide, varying somewhat; long oval or ovate (viewed edgewise oval or ovate, sides often unsymmetrical). Axis one-fifth to one-fourth way from dorsal to ventral edge. Ventral edge plump, much curved, usually curved most at apex; often ridged on one side of wing; wing thin, wide, generally prominent at apex, narrower at base than elsewhere. Dorsal edge rather straight or slightly curving; generally smooth, seldom with ridge. Base generally narrow and pointed; dorsal shoulder very small, ventral shoulder sloping; stem scar very small, usually at right angles to axis. Apex varies, generally bluntly pointed.

FIGURE 6.—Branch showing foliage characteristics of the Harpareil. The mature leaves are wider in proportion to length than are those of the Jordanolo; also, the blades of the Harpareil leaves are symmetrical or nearly so.

Shell.—Soft. Outer shell very thin, often spongy or crumbly; outer surface medium brown in color. Inner shell very thin, hard; inner surface a medium brown; ventral streak dark brown, commonly very wide with blunt base, running close to base of nut. Pits generally numerous; large, mostly round; deep. Canals medium in size, oval. Fibers medium in size.

Kernel.—Many doubles (7 to 19 percent, varying greatly with the season). Size large. Shape moderately plump, wide ovate as a rule (viewed edgewise shape is elliptical-ovate). Ventral edge sharply curved, curving most at base. Dorsal edge only slightly curved. Base bluntly rounded, sloping on ventral side; dorsal shoulder above scar. Apex pointed. Pellicle rather light to medium brown in color; rather thick and tough, with short pubescence. Pellicle fold small to medium. Base scar generally large, dark brown, oval.

CHARACTERISTICS

The Harpareil resembles the Jordanolo in many respects but is on the whole inferior to that variety. The tree is a vigorous and thrifty

grower (fig. 5). The foliage is heavy and dense (fig. 6). This variety is a heavy bearer, but is not as regular in bearing habit as the Jordanolo (fig. 7). Although it is not so susceptible to brown rot as the Drake, it is more so than the Jordanolo. The nuts are easily harvested and hulled. The nuts in the shell and the kernels are large in size and are very similar to those of the Ne Plus Ultra in shape. The shell is darker in color than the Jordanolo. The kernels blanch well, but on account of the double kernels they are somewhat expensive

FIGURE 7.—Branches of Harpareil in bearing. The variety is a good bearer but is not so regular in bearing habit as the Jordanolo. Note the abundant foliage.

to blanch, largely because of the additional labor involved in removing the double kernels and the low prices obtained for them after they are removed. The Harpareil cannot compete with the Jordanolo. The Harpareil nuts and kernels are very similar to those of the Ne Plus Ultra but are somewhat superior.

The Harpareil is an early blooming variety. Its first blossoms appear soon after the first ones open on the Jordanolo variety, but blossoming continues over a longer period. The Harpareil, at least in some localities, is a very straggling bloomer. It blossoms over the

period covered by the Ne Plus Ultra but continues into that of the Nonpareil and even extends as late as the blooming period of the Texas. Although its straggling blooming period gives the Harpareil a better chance for pollination than the Jordanolo has, this is not of much real advantage, since there is a greater chance of infection with brown rot than would be the case if the blossoming period were shorter. Furthermore, effective spraying is difficult, because the blossoms open over such a long period that there are always some not protected by the spray.

The Harpareil interpollinates best with the Ne Plus Ultra and I. X. L. In some seasons it interpollinates with the Peerless, or with the Nonpareil, or even with the Drake and the Texas, but it cannot be recommended for interpollination with these varieties for all seasons and localities. Unfortunately, the Harpareil and Jordanolo are incompatible, and therefore cannot pollinate each other.

ADAPTATION

The Harpareil has been tested under various conditions in 125 trial plots in different parts of California. It is a vigorous grower and produces well, but is more inclined to alternate bearing than is the Jordanolo. It succeeds wherever the Ne Plus Ultra can be grown with success. Owing to a slight susceptibility to brown rot, it probably should not be planted extensively in localities where that disease is serious. The Harpareil is better in some respects than the Ne Plus Ultra and seems to be in no respect inferior. Although the Harpareil is of value, it is believed that in most cases under present conditions growers should plant the Jordanolo in preference to the Harpareil.

DISTRIBUTION

The breeding work was conducted by the United States Department of Agriculture in cooperation with the California Agricultural Experiment Station. The trees for trial were distributed jointly by these institutions, but neither the Department nor the California station have any nursery trees of either variety for distribution. The varieties will be propagated and distributed through the usual commercial channels. Nurserymen will probably offer a limited number of trees in 1939, although it may be a year or two later before the trees will be available in large quantities. Growers who wish to obtain nursery trees of these varieties should look to nurserymen for their requirements.

It is believed that the Jordanolo variety promises to become an important one for various districts in California, and the Harpareil to be of some value for limited planting in certain sections. Neither the Bureau of Plant Industry of the Department nor the California station makes or implies any guarantee regarding their performance.

SUMMARY

Two promising new varieties of almond, the Jordanolo and Harpareil, have been originated by breeding. Both of these have been tested in various orchards in the leading almond districts of California and are now released for commercial propagation and distribution.

The Jordanolo is outstanding in many ways. The tree grows vigorously, produces dense, thrifty foliage, yields heavily, and resists the attacks of mites (red spiders) to a remarkable extent. The nuts are easily and cheaply harvested and hulled. The shell is soft and the kernel content good. The kernels are free from doubles and are of desirable shape, resembling those of the Jordan in shape and size. The kernels blanch well and have a tender texture. The nut is well adapted to certain markets. Furthermore, this variety is well adapted to growth conditions in California, the only objection being its early blooming habit.

The Harpareil is a vigorous grower and produces dense foliage; it bears well, although it is more irregular in bearing habit than the Jordanolo. The nuts, like those of the Jordanolo, are easily harvested and hulled. The nut is in the Ne Plus Ultra class, resembling the nut of that variety closely. The kernel, however, is superior to that of the Ne Plus Ultra. Although the Harpareil is not as outstanding as the Jordanolo, it is believed that the variety can be grown to advantage in a somewhat limited way.

The Jordanolo and Harpareil will be propagated and distributed through the usual commercial channels.

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